**20EE102**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July/ 2021** | **Electrical & Electronics Engineering** | | |
| **First Semester** | **WAVES & MODERN PHYSICS** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

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|  |  |  | CO | BL | M |
| 1 | a) | Explain the term “ Pumping” | CO1 | L1 | 1M |
|  | b) | Define Acceptance angle | CO1 | L1 | 1M |
|  | c) | List out the advantages of optical fibers | CO1 | L1 | 1M |
|  | d) | What are matter waves | CO2 | L1 | 1M |
|  | e) | Define inductive reactance in AC circuit | CO2 | L1 | 1M |
|  | f) | Define quality factor. | CO2 | L1 | 1M |
|  | g) | What is poyinting vector? | CO3 | L1 | 1M |
|  | h) | What is Hall effect? | CO3 | L1 | 1M |
|  | i) | Discuss the applications Ultrasonic waves | CO3 | L1 | 1M |
|  | j) | What are the radio isotopes? | CO4 | L1 | 1M |
|  | k) | Define piezo electric effect. | CO4 | L1 | 1M |
|  | l) | What is the purpose of quenching agent? | CO4 | L1 | 1M |
|  | m) | Write the properties of laser. | CO2 | L1 | 1M |
|  | n) | What is the de-Broglie wave length of electron accelerating in 100V potential difference? | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Illustrate the construction and working mechanism of  Ruby laser with neat diagram | CO1 | L2 | 7M |
|  | b) | Write the applications of laser. | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Define numerical aperture and acceptance angle and derive expression for them. | CO1 | L3 | 7M |
|  | b) | Calculate the numerical aperture of a given optical fiber, if the refractive indices of core and cladding are 1.54 and 1.42 respectively. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Derive the expressions of impedance of LCR series circuit and obtain the condition for resonance. | CO2 | L3 | 7M |
|  | b) | Write the integral and differential forms of Maxwell’s equations. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Explain the principle, construction and working of cyclotron and write limitations. | CO2 | L2 | 7M |
|  | b) | Write the applications of Hall effect. | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Explain de-Broglie hypothesis and derive the wave length of matter waves | CO3 | L2 | 7M |
|  | b) | State and explain Heisenberg’s uncertainty principle | CO3 | L3 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Derive one dimensional Time independent Schrodinger wave equation for a particle. | CO3 | L2 | 7M |
|  | b) | Explain physical significance of wave function and write its limitations. | CO3 | L2 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Describe the production of ultrasonic waves by magnetostriction method. | CO4 | L2 | 7M |
|  | b) | Discuss the various properties of ultrasonic waves | CO4 | L3 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Describe the construction and working of GM counter. | CO4 | L2 | 7M |
|  | b) | Write the applications of radio isotopes in medicine. | CO4 | L3 | 7M |

